

I claim:

1. In a coolant delivery apparatus for a machine tool wherein each of a plurality of cutting tools is movable into cutting position with respect to a workpiece, the improvement comprising:

a source of coolant;

a nozzle having a coolant inlet to receive coolant from said source;

means pivotally mounting said nozzle in facing relation to each of said tools when a selected one of said tools is advanced into cutting position whereby the coolant stream is discharged from said nozzle to intersect said selected tool; and

non-motorized actuator means associated with said nozzle to automatically adjust the angle of attack of said coolant stream with respect to each of said selected tools whereby to cause the coolant stream to intersect a location proximal to the interface between each of

said selected tools and said workpiece.

2. In a coolant delivery apparatus according to claim 1 wherein said nozzle is mounted on said machine tool and said machine tool is movable linearly toward and away from said workpiece, and said control means including drive means engageable with said mounting means for causing pivotal movement of said nozzle in response to the linear movement of said machine tool.

3. In a coolant delivery apparatus according to claim 2 wherein said drive means is operative to move said nozzle between a reference position and an aiming position.

4. In a coolant delivery apparatus according to claim 2 wherein said drive means follows the linear movement of said machine tool.

5. In a coolant delivery apparatus according to claim 3 wherein locking means is provided for locking said nozzle in intermediate

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aiming positions for directing coolant at each of
5 said selected tools.

6. In a coolant delivery apparatus according to claim 3 wherein a stop member is disposed in the path of travel of said drive means.

7. In a coolant delivery apparatus according to claim 2 wherein said mounting means includes a hollow shaft, said nozzle extending radially from communication with said shaft and
5 having a nozzle discharge end extending normal to a rotational axis of said shaft.

8. In a coolant delivery apparatus according to claim 7 wherein said drive means includes a retractable plunger.

9. In a coolant delivery apparatus according to claim 8 including a housing for said retractable plunger, said shaft extending through said housing in a direction transversely of said
5 plunger, said nozzle mounted on one end of said

shaft, and a coolant inlet at an opposite end of said shaft.

5 10. In a coolant delivery apparatus according to claim 8 wherein an annular crank is mounted on said shaft, said plunger including means connected to said crank to impart rotational movement to said shaft in response to linear movement of said plunger.

 11. In a coolant delivery apparatus according to claim 10 including biasing means yieldingly urging said plunger toward said stop member.

5 12. In a coolant delivery apparatus according to claim 11 wherein locking means is provided in said housing for releasably locking said crank against rotation, said locking means being disposed in diametrically opposed relation to said plunger.

 13. In a coolant delivery apparatus according to claim 12 wherein said locking means

includes a slidable block movable into frictional engagement with said crank.

14. In a machine tool, a coolant delivery apparatus for a cutting tool which is movable into cutting position with respect to a workpiece comprising:

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a source of coolant;

a nozzle having a coolant inlet to receive coolant from said source;

means pivotally mounting said nozzle in relation to said cutting tool whereby the coolant stream is discharged from said nozzle to intersect a portion of said cutting tool;

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mechanical actuator means associated with said nozzle to adjust the angle of attack of said coolant stream with respect to said cutting tool; and

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means for retaining said nozzle in fixed relation to said cutting tool when the coolant stream is discharged therefrom.

15. A coolant delivery apparatus according to claim 14 wherein a machine tool

includes a plurality of cutting tools, said nozzle
is mounted on said machine tool and said machine
5 tool is movable vertically with respect to said
workpiece, and linear drive means engageable with
said mounting means for causing pivotal movement
of said nozzle in response to the vertical
movement of said machine tool.

16. A coolant delivery apparatus
according to claim 14 wherein said linear drive
means includes a retractable plunger being
operative to pivot said nozzle between a reference
5 position and an aiming position.

17. A coolant delivery apparatus
according to claim 16 wherein said retractable
plunger follows the vertical movement of said
machine tool.

18. A coolant delivery apparatus
according to claim 17 wherein said locking means
is operative to releasably lock said nozzle in
intermediate positions between said reference
5 position and aiming position for directing coolant

at each of said cutting tools, and a stop member in the path of travel of said plunger.

19. A coolant delivery apparatus according to claim 16 wherein said mounting means includes a hollow shaft, said nozzle extending radially from communication with said shaft and having a nozzle discharge end extending perpendicular to a longitudinal axis through said shaft, a housing for said plunger, said shaft extending through said housing in a direction transversely of said plunger, said nozzle mounted on one end of said shaft and said coolant inlet disposed at an opposite end of said shaft.

20. A coolant delivery apparatus according to claim 19 wherein an annular crank is mounted on said shaft, said plunger including means connected to said crank to impart rotational movement to said shaft in response to linear movement of said plunger, and means yieldingly urging said plunger toward said stop member.

21. The method for automatically

positioning a nozzle on a machine tool for
discharge of a coolant onto a cutting tool which
is in cutting position with respect to a workpiece
comprising the steps of:

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supplying a coolant to said nozzle;
pivotally mounting said nozzle in
facing relation to each of said cutting tools
which are advanced into cutting position;

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pivoting said nozzle in response to
movement of said machine tool to adjust the angle
of attack of said cooling stream whereby to cause
the coolant stream to intersect a portion of said
tool which is advanced into cutting position; and

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retaining said nozzle in fixed
relation to each said cutting tool when said
cutting tool is advanced into cutting position.

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22. The method according to claim 21
including the step of providing a linear drive
member to pivot said nozzle, and correlating the
distance of movement of said linear drive member
with a diameter or length of each said cutting tool
advanced into cutting position whereby to
automatically adjust the angle of attack of the

coolant stream to strike a portion of each said cutting tool advanced into cutting position.

23. The method according to claim 21 including the step of advancing said nozzle to a reference position between movement of successive cutting tools into cutting position.

24. The method according to claim 21 including the step of advancing said nozzle from the reference position to a coolant-applying position for each of said cutting tools, and holding said nozzle in each coolant-applying position.

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